Although it is not clear which arguments the Examiner believes to be unsupported by the claims, an attempt has been made to amend the wording of the claims to even more closely match the wording of the arguments. For example, the claims have now been amended to recite rotation of the rotor about a single axis (corresponding to the "z-axis" mentioned in the arguments), as is clearly illustrated in the original drawings. Of course, many of the arguments have to do with application of the *Howard* case, which considers the question of whether combining separate elements of the prior art is inherently obvious, and with the propriety of *combining* the Dauwalter and Gardner patents to obtain the claimed invention. These arguments are not affected by the claim amendments.

Having further amended the claims to make the arguments easier to understand, the arguments made in the response to the final rejection will now be repeated:

1. Rejection of Claims 1, 2, 5, 6, and 9-10 Under 35 USC §103(a) in view of U.S. Patent No. 5,959,382 (Dauwalter) in view of "common knowledge in the art"

This rejection is respectfully traversed on the grounds that the Dauwalter patent fails to disclose or suggest using a flat metal part of an apparatus to be driven as the rotor of an induction motor system, much less using slots in the wheel to indicate the position of the rotor. Instead, Dauwalter discloses a magnetic rotor that is magnetically suspended from a stator and that is made to move or rotate in a controlled manner with five degrees of freedom, in contrast to the claimed invention which controls rotation about a "single axis"–*i.e.*, the sixth degree of freedom.[1] Furthermore, the rotor of Dauwalter is not a flat metal part of an apparatus to be driven, and cannot possibly be such a part if it is to be suspended in the disclosed manner. Finally, while the slots between the teeth in the rotor of Dauwalter might assist in positioning of the motor, they are not used to detect the position of the motor, as claimed.

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[1] According to Dauwalter, col. 5, lines 50-52: The sixth degree is the required rotor rotation which is controlled in a known fashion ***that does not form part of this invention.***

It is true that individual elements of the claimed *combination* are arguably known. In fact, virtually all patented inventions are made up of known elements. However, none of the references that disclose individual elements of the combination, *i.e.*, elements of flat disc induction motors, even remotely suggests that the rotor may be part of an apparatus, such as the wheel assembly of a vehicle, and it is certainly not "common knowledge in the art" to do so.

Instead of showing that the prior art teaches the claimed combination, the Examiner cites the 1893 case of *Howard v. Detroit Stove Works.* According to the Examiner, combining separate elements of the prior art is inherently obvious, regardless of context, function, prior relationship between the parts, or any of the other considerations that normally must be taken into account in a proper rejection under 35 USC §103(a). In response, the Applicant respectfully submits that the *Howard* case merely concerns a method of making a previously known combination, and not the question of whether a novel combination is obvious. In particular, the *Howard* case concerned **identical** structures with **identical** functions, the only difference being that one of the structures was cast in **two pieces** and welded, and the other was cast in **one piece**. As explained therein:

> *However this may be, it is conclusively shown that the Monumental grate, which was in public use fie years before application was made for the patent under consideration, contains* **all** *of the elements of the Beckwith grate, except that, being adapted for burning coal, it is cast in two pieces, while the Beckwith grate is cast in one piece. This does not involve patentable invention...As to the third patent, it is void because the claims in it were* clearly anticipated ***and because it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together****, nor to make the shape of the grate correspond with that of the firepot.*

It may be true that the it is not necessary to find teachings in the prior art when the invention involves casting in one piece an article which has formerly been cast in two pieces and put together, but the *Howard* case says nothing about the combination of two elements that have not previously been combined, such as a spoked wheel and rotor of an electric motor. It is respectfully submitted that the Howard case, which was decided 60 years before 35 USC §103 was enacted, does not negate the requirement in numerous more recent cases that in order for an

invention to be obvious, there must be some express or implied teaching which would have suggested the claimed invention.

The invention does not merely involving a change in the method of forming a grate, as in the *Howard* case (one-piece casting versus separate casting and welding), but rather involves a number of features not suggested by any of the references of record, including:

- a propulsion system in which a portion of an apparatus to be driven, such as a wheel, brake disk, propeller, fan blade assembly, or the like, is formed by the rotor of a flat induction motor (claims 1, 5, and 9);
- a flat induction rotor that includes slots that extend into the rotor, reducing the weight of the rotor and serving to enable detection of rotor position (claims 1, 5, and 9); and
- slots that extend through the rotor (claims 13-15) to, for example, forms spokes (claims 3, 7, and 11).

In contrast, the Dauwalter patent discloses a stepper motor, and moreover one that is magnetically suspended, making use as an induction motor **impossible**.

As noted previously, the claimed invention is based on the realization that if the wheels of a vehicle (or driven parts of other apparatus such as a propeller or fan blade assembly) are made of a suitable metal, the wheels or other driven parts can serve as rotors of an induction motor system, thereby eliminating the need for a drive train connecting the motor and the wheels or other driven parts. In all of the thousands of pieces of prior art available to the Examiner, not one even hints of the possibility of integrating the rotor of an induction motor with driven parts of an apparatus. Furthermore, the claimed invention adds the feature, which is also not taught in any of the references available to the Examiner, of extending slots into (and, more specifically through) the rotor, thereby reducing the weight of the rotor and at the same time providing reference points for detection of rotor position (necessary to control torque or angular velocity of the motor).

While the notches between the teeth of the motor of Dauwalter are arguably "slots," they are clearly not slots that extend into or through the rotor as now claimed, and their function does not correspond to that of the claimed slots. To the contrary, the rotor of Dauwalter would be inoperative if the slots extended all the way through the rotor since positioning of the rotor, as is necessary to accomplish such stated purposes as the positioning of disk read/write heads of data storage devices, depends on magnetic interaction between the stator poles and the corresponding poles on the rotor. Such magnetic interaction locks the actuator in a precisely determined position for a desired period of time, and enables rapid changes of position by permitting rapid deceleration following rapid acceleration as the movable member is moved to the desired track. This is in contrast to the propulsion system of the invention, in which the stopping position of the motor makes no difference, and the slots are used to control driving, *i.e.*, speed or angular velocity, of the motor.

The skilled artisan would not consider the "slots" of a magnetically suspended stepper motor of the type taught by Dauwalter to be suggestive of the slots of the claimed invention, which are used for commutation rather than for stopping the motor at a particular position. The claimed invention controls the stator current solely for the purpose of propulsion control, *i.e.*, control of vehicle speed, while Dauwalter controls the current flow in the stator in order to achieve precise positioning of the rotor relative to the stator. These are not analogous functions, and Dauwalter has none of the advantages of the present invention, which includes a high torque to weight ratio, and elimination of a drive train.

Because none of the references cited in the application to date discloses or suggests use of a driven part of an apparatus, such as a wheel, as an induction motor rotor in order to eliminate the need for differentials, torque converters, drive chains, and/or other parts of the drive train of a conventional vehicle, or the claimed slots which serve to enable smooth operation of the motor by providing a reference, and which further reduce the weight of the motor and enhance its appearance, withdrawal of the rejection of claims 1, 2, 5, 6, and 9-10 under 35 USC §103(a) is again respectfully requested.

2. Rejection of Claims 3, 4, 7, 8, 11, and 12 Under 35 USC §103(a) in view of U.S. Patent Nos. 5,959,382 (Dauwalter) and 6,283,255 (Gardner)

This rejection is respectfully traversed on the grounds that the Gardner patent, like the Dauwalter patent, fails to disclose or suggest disclose or suggest using a driven part of an apparatus, such as the spoked wheel of a vehicle, as the rotor of an induction motor system, much less using slots in the wheel to indicate the position of the rotor during driving. Instead, the Gardner patent discloses a caliper assembly for a motorcycle in which the caliper frictionally engages a brake disk. There is absolutely no suggestion of using the brake disk as a rotor of an electro-magnetic device, and it makes to sense to use a friction brake rotor for that purpose. It also makes no sense to use a magnetically suspended stepper motor rotor of the type taught by Dauwalter in the friction brake assembly of Gardner.

To base a rejection on a combination which has no basis in the references themselves, while completely ignoring the intended purposes and functions of the primary reference, is clearly and improper hindsight rejection. As stated in **MPEP 2143.02** (page 2100-111):

> *If proposed modification would render the prior art invention being modified* ***unsatisfactory for its intended purpose****, then there is no suggestion or motivation to make the proposed modification*" (citing *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

Also as stated in **MPEP 2143.02**:

> *If the proposed modification or combination of the prior art would* ***change the principle of operation of the prior art invention being modified****, then the teachings of the references are not sufficient to render the claims prima facie obvious* (citing In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)...*The court reversed the rejection holding the "suggested combination of references would require a* ***substantial reconstruction and redesign*** *of the elements shown in [the primary reference]* ***as well as a change in the basic principle under which the [primary reference] construction was designed to operate"*** *123 USPQ at 352.* (See also, MPEP 2141.02, p. 2100-107 "**A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention** (emphasis in the original).

It is respectfully submitted that modifying the magnetically suspended stepper motor rotor of Dauwalter to serve as a friction brake disc in the manner taught by Gardner represents just such a "substantial reconstruction and redesign" and "change in principle" of the rotor of Dauwalter, and therefore that the proposed combination of Dauwalter and Gardner would be improper even if it somehow could result in the claimed invention, which it cannot.

In the claimed invention, the function of braking is achieved via the electromagnetic force that is generated by regeneration of the motor. There is no frictional force involved with the braking function, and no need for brake shoes and pads of the type used by Gardner. Accordingly, even if the proposed combination of Gardner and Dauwalter were proper, the claimed invention would not have resulted, and withdrawal of the rejection of claims 3, 4, 7, 8, 11, and 12 under 35 USC §103(a) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

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APPENDIX A
(Clean Copy Of Amended Claims)

1. (Twice Amended) A flat induction motor for driving a part of an apparatus, comprising:

a disc-shaped flat metal rotor including a plurality of slots that extend into the rotor and that are distributed around a center of the rotor in a generally circular configuration, said rotor being arranged to rotate around a single axis of rotation;

a stator including a plurality of coil means positioned near the rotor to cause rotation of the rotor by magnetic interaction therewith;

energy controlling commutation means for detecting a position of said slots in order to detect a position of said rotor relative to said coils, and causing current to pass through said coil means based on the detected position of said slots in order to cause rotation, and control driving, of the rotor,

wherein said rotor is the part of the apparatus to be driven by the motor.

5. (Twice Amended) A flat induction motor for driving a part of an apparatus, comprising:

a flat metal induction rotor comprising a metal plate bent into a circular shape and including a plurality of slots that extend into the rotor and that are distributed around the rotor, said rotor being arranged to rotate around a single axis of rotation;

a stator including a plurality of coil means positioned near the rotor to cause rotation of the rotor by magnetic interaction therewith;

energy controlling commutation means for detecting a position of said slots in order to detect a position of said rotor relative to said coils, and causing current to pass through said coil means based on the detected position of said slots in order to cause rotation, and control driving, of the rotor,

wherein said rotor is the part of the apparatus to be driven by the motor.

9. (Twice Amended) A flat induction motor for driving a part of an apparatus, comprising:

a flat metal induction rotor comprising a metal plate having a ring shape and including a plurality of slots that extend into the rotor and that are distributed around the rotor, said rotor being arranged to rotate around a single axis of rotation;

a stator including a plurality of coil means positioned near the rotor to cause rotation, and control a speed, of the rotor by magnetic interaction therewith;

energy controlling commutation means for detecting a position of said slots in order to detect a position of said rotor relative to said coils, and causing current to pass through said coil means based on the detected position of said slots in order to cause rotation, and control driving, of the rotor,

wherein said rotor is the part of the apparatus to be driven by the motor.

APPENDIX B
(Marked-Up Copy Of Amended Claims)

1. (Twice Amended) A flat induction motor for driving a part of an apparatus, comprising:

a disc-shaped flat metal rotor including a plurality of slots that extend into the rotor and that are distributed around a center of the rotor in a generally circular configuration, said rotor being arranged to rotate around a single axis of rotation;

a stator including a plurality of coil means positioned near the rotor to cause rotation of the rotor by magnetic interaction therewith;

energy controlling commutation means for detecting a [relative] position of [the coil means and the slots] said slots in order to detect a position of said rotor relative to said coils, and causing current to pass through said coil means based on the detected [relative] position of said slots in order to cause rotation, and control driving, of the rotor,

wherein said rotor is [integral with] the part of the apparatus to be driven by the motor.

5. (Twice Amended) A flat induction motor for driving a part of an apparatus, comprising:

a flat metal induction rotor comprising a metal plate bent into a circular shape and including a plurality of slots that extend into the rotor and that are distributed around the rotor, said rotor being arranged to rotate around a single axis of rotation;

a stator including a plurality of coil means positioned near the rotor to cause rotation of the rotor by magnetic interaction therewith;

energy controlling commutation means for detecting a [relative] position of [the coil means and the slots] said slots in order to detect a position of said rotor relative to said coils, and causing current to pass through said coil means based on the detected [relative] position of said slots in order to cause rotation, and control driving, of the rotor,

wherein said rotor is [integral with] the part of the apparatus to be driven by the motor.

9. (Twice Amended) A flat induction motor for driving a part of an apparatus, comprising:

a flat metal induction rotor comprising a metal plate having a ring shape and including a plurality of slots that extend into the rotor and that are distributed around the rotor, said rotor being arranged to rotate around a single axis of rotation;

a stator including a plurality of coil means positioned near the rotor to cause rotation, and control a speed, of the rotor by magnetic interaction therewith;

energy controlling commutation means for detecting a [relative] position of [the coil means and the slots] said slots in order to detect a position of said rotor relative to said coils, and causing current to pass through said coil means based on the detected [relative] position of said slots in order to cause rotation, and control driving, of the rotor,

wherein said rotor is [integral with] the part of the apparatus to be driven by the motor.